

➤ Step 1

a) FireWire and USB are good candidates for connecting external hard disk. Since the External hard disk is usually located more than 0.5m from the mother board. USB or FireWire due to hot swap capabilities and access to the drive.

➤ Step 2

b) USB due to distance from the CPU and low bandwidth requirements. FireWire would not be as appropriate due to its daisy chaining implementation.

> Step 1

Fire Wire: Uses a daisy chain approach. A controller exists in each device that generates requests for the device and processes requests from devices after it on the bus. Devices relay requests from other devices along the daisy chain until they reach the main bus controller.

> Step 2

USB: Similar to the PCI bus except that data and control information is communicated serially from the bus controller.

> Step 3

PCI: Uses a single, parallel data bus with control lines for each device. Individual devices do not have controllers, but send requests and receive commands from the bus controller through their controller lines. Although the data bus is shared among all devices, control lines belong to a single device on the bus.

> Step 4

SATA: As the name implies, serial ATA uses a serial, point to point connection between a controller and device. Although both SATA and USB are serial connections, point to point implies that unlike USB, data lines are not shared by multiple connections. Like USB and Fire Wire, SATA devices are not swappable.

Step 1

Limitations of each of the bus types are :

FireWire: It uses Daisy chaining technique using which we can connect unlimited number of devices. The limitation is if any of the devices in daisy chain fails, remaining devices cannot communicate with controller.

The multiplexed nature of communication using FireWire makes communication much faster when compares to USB.

PCI: There are data limits in using parallel bus i.e. length of bus. It has fixed number of control lines which limits the number of devices connected to bus.

PCI buses are not useful for peripherals that are physically distant from the computer.

USB: It has communication speed limit due to serial nature of communication. USB buses are useful for peripherals with relatively low data rates that must be physically distant from the computer.

SATA: Due to high-speed nature SATA connections limits the length of the connection between controller and devices. The distance is longer than PCI, but shorter than FireWire or USB. As SATA connections are point-to-point, thus not as extensible as either USB or FireWire.